

ILLUSTRATIONS OF NEW OR RARE ANIMALS
IN THE ZOOLOGICAL SOCIETY'S LIVING
COLLECTION¹

VII.

17. **HARDWICKE'S CIVET-CAT** (*Hemigalea Hardwickii*).—The Viverridæ, or Civet-cats, form a well-marked family of carnivorous mammals peculiar to the tropics of the Old World, and mostly confined to Southern Asia and Africa, though one or two of them occur in the southern parts of Europe. One of the finest and largest of them is the True Civet-cat (*Viverra civetta*), from the anal glands of which the old-fashioned perfume known as civet is extracted, and the Genets, Ichneumons, and Mongoosees are well-known members of the same family, examples of which are always to be seen in the Zoological Society's Collection.

Amongst the rarer and less familiar forms of the Viverrine groups is the very curiously-marked animal which we now figure (Fig. 17) from a specimen received by the Society in October, last year. Hardwicke's Civet, though

first described by Dr. Gray so long ago as 1830, is a very scarce and little-known species, and the present example is believed to be the first of its kind ever brought alive to this country. In 1840 Müller and Schlegel gave an excellent figure and description of this animal, under the name of *Viverra boiei*, in their great work upon the Natural History of the colonial possessions of the Netherlands. Their specimen was obtained in South-Eastern Borneo by Herr Henrici, and sent alive to the Gardens of the Zoological Society of Amsterdam. Hence, after its death, it was transferred to the National Museum of Leyden. Müller adds that he never met with this Civet-cat himself during his extensive travels in the Eastern Archipelago, and had received no information as to its habits.

Hardwicke's Civet-cat was also figured and described by Eydoux and Souleyet in the "Zoology" of the voyage of the *Bonite* in 1841, under the name *Hemigale zebra*, but again without any information as to its habits, not even the locality of their specimen being stated.

So far as has been ascertained from the Zoological



FIG. 17.—Hardwicke's Civet-cat.

Society's living specimen, this animal is excessively shy and retiring in disposition, and apparently does not leave its retreat voluntarily except at night. When handled, it ejects a highly acrid and skunk-like secretion from its anal glands. The length of the body in the example figured is about 24 inches, and that of the tail about 18 inches.

18. The Warty-faced Honey-Eater (*Meliphaga phrygia*).—No group of animals is more characteristic of the peculiar fauna of Australia than the great family of Honey-Eaters (Meliphagidæ), of which upwards of sixty species, belonging to many different genera, are distributed throughout the length and breadth of that Continent. But although the Honey-eaters are so common in Australia, and there is an extensive importation of living birds from Sydney and other Australian ports every year into this country, very few of the Meliphagidæ have yet reached Europe alive. Almost the only Honey-eater habitually imported living—is the so-called Parson-bird (*Prosthemadera Novæ Zealandiæ*) of New Zealand, which is much valued in that colony as a cage-bird, and thus finds its

way not unfrequently to London. The fact is, that the organisation of the Honey-eaters, being adapted for an active and wandering life, in perpetual search of the nectar of the flowering-trees which their pencilled tongue so admirably fits them to collect, does not render them very suitable subjects for captivity, and it is only recently that means have been found to preserve these birds alive and in good health in cages. It has thus happened that almost the only one of the vast tribe of Australian Honey-eaters that has been exhibited in the Zoological Society's aviaries is the present species, which we now figure (Fig. 18) from four examples lately received from New South Wales.

In his great work on the "Birds of Australia," Mr. Gould tells us that the Warty-faced Honey-eater is not only one of the handsomest of its tribe, but also one of the most beautiful birds inhabiting Australia, the strongly contrasted tints of its black and yellow plumage rendering it a most conspicuous and pleasing object, particularly during flight.

Although very generally distributed, its presence ap-

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pears to be dependent upon the state of the *Eucalypti*, upon the blossoms of which it mainly depends for subsistence; it is consequently only to be found in any particular locality during the season that those trees are in blossom. It generally resorts to the loftiest and most fully-flowered tree, where it frequently reigns supreme, buffeting and driving every other bird away from its immediate neighbourhood; it is, in fact, most pugnacious, evincing particular hostility to the smaller *Meliphagida*, and even to others of its own species that may venture to approach the trees upon which two or three have taken their stations.

Mr. Gould further tells us that the nest of the honey-eater, which is usually constructed on the overhanging branch of a *Eucalyptus*, is round, cup-shaped, about five inches in diameter, composed of fine grasses, and lined with a little wool and hair. The eggs are two in number, of a deep yellowish buff, marked all over with indistinct spots and irregular blotches of chestnut-red and dull purplish grey, particularly at the larger end, where they frequently form a zone; they are eleven lines long, by eight lines and a half broad.

The stomachs of the specimens killed by Mr. Gould were entirely filled with honey; insects, however, he says, doubtless form a considerable portion of their diet.

The examples of the species now in the Zoological Society's Gardens are four in number, and apparently form two pairs, but there is little or no external difference between the sexes. They are lodged in one of the large cages at the back of the "Insect-house," and show every sign of good health. It is even hoped that they may nest and breed in captivity.

19. The Lobed Musk-duck (*Biziura lobata*).—Water-fowl have always formed a favourite portion of the Zoological Society's living collection, and a considerable number of species of swans, ducks, and geese of various sorts have from time to time reproduced their kind in the ponds and inclosures in the north garden. Many of these have been introduced by the Society for the first time into Europe, and have thence found their way into the other Gardens on the continent.

Owing to the great success which has attended their efforts in these directions, the Society are always specially anxious to add new species to this branch of their living series, and it is with great satisfaction that every new addition to the already long list of "acclimatisable" Anatidæ is announced in their journals. The species which is now portrayed (Fig. 19) is certainly one of the most remarkable that they have yet procured, and although perhaps not likely to be "acclimatised" at present, is well worth examination as being remarkable even amongst Australian animals, for several very abnormal features in its structure. Mr. Gould, to whose great works every writer upon the mammals and birds of Australia must not fail to turn for information, tells us that the Musk-duck belongs to a genus of which only a single species

is known, and which is singularly different from every other member of the Anatidæ; so different, in fact, that although like Bonaparte, he has placed it next to *Erismatura*, he believes its alliance to that form is

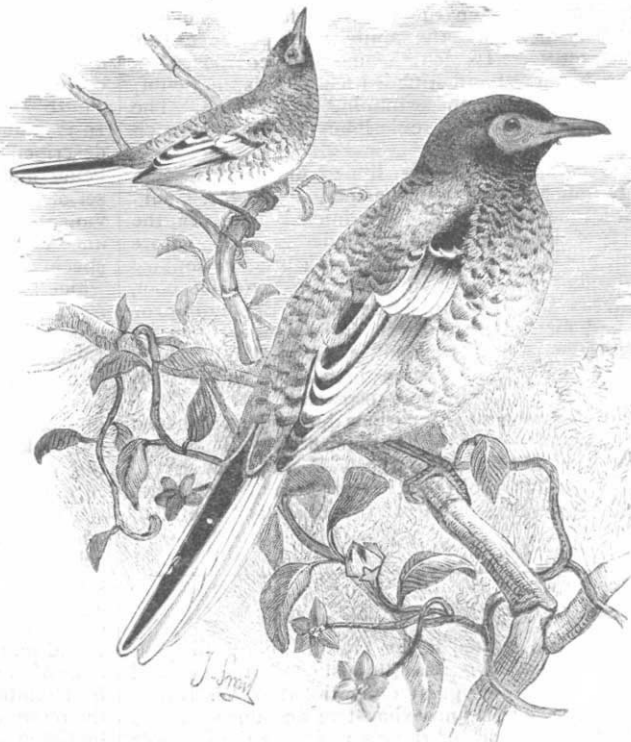


FIG. 18.—Warty-faced Honey Eater.

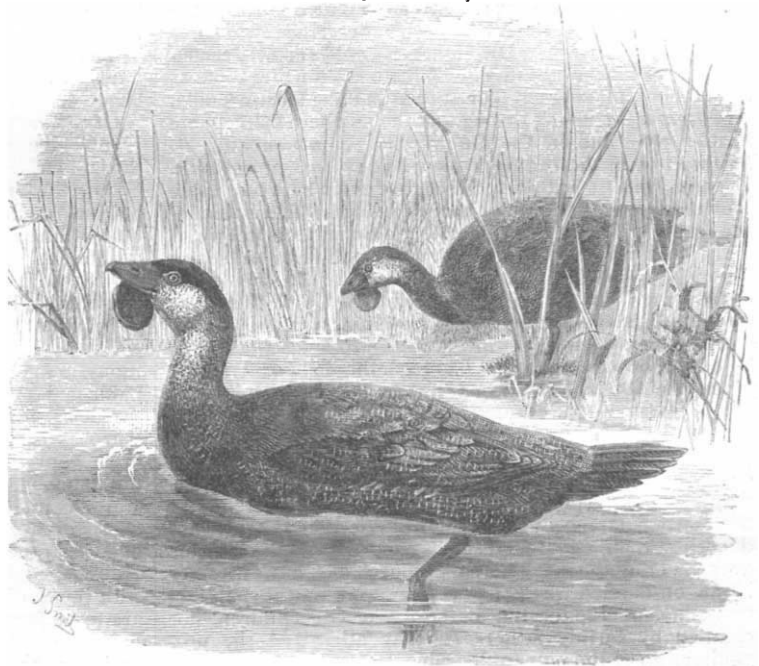


FIG. 19.—The Lobed Musk Duck.

but a seeming one. "There is something about this extraordinary bird," Mr. Gould continues, "which reminds one of the cormorants"; yet no ornithologist

would, he presumes, associate it with those birds. "Like many other of these antipodean forms, it must be regarded as an anomaly; it is, in fact, a *Biziura*, and nothing more, for it stands alone."

The Musk-duck has a lengthened, stiff, and leather-like appendage hanging from the under surface of the bill, and is the only member of the family which possesses this singular structure. Its lengthened tail, composed of twenty-four narrowed and stiffened feathers, is, no doubt, most serviceable to it in swimming and diving. The female does not carry the chin-lobe, and is very much smaller than the male bird.

The Musk-duck is widely distributed on the Australian Continent, and also inhabits Tasmania. As Mr. Gould tells us, it frequents the bays and inlets of the sea, the upper parts of rivers, lakes, and secluded pools. "More than a pair are rarely seen at one time; often a solitary individual takes up its abode in some favourite pool, where it lives a life of complete seclusion, depending for its food and for its preservation from danger upon its powers of diving rather than upon those of flying. It is very difficult to shoot, as it dives instantly a gun is fired, so that the shot has hardly time to reach it."

The male examples of this curious duck were purchased by the Zoological Society on February 8 last. They were not in good condition when received, and though the utmost care was taken of them, one of them is since dead. The other may be seen in one of the tanks at the end of the Fish-house.

THE LIFE-HISTORY OF THE EEL

ALL persons interested in the mystery that until quite recently hung over the life-history of the eel, will find themselves under great obligations to W. Brown Goode for the very able and exhaustive account which he has quite recently published on this subject in the *Bulletin* of the United States Fish Commission, based upon the scholarly work of Jacoby, and from which we abstract the following. The number of species described by some authors is very large. Dr. Günther would seem to recognise only about twenty-five. Dareste still further reduces the number, making but four species in the genus *Anguilla*. *A. vulgaris*, occurring throughout the northern hemisphere in the New and in the Old World, *A. mowia* and *A. marmorata* in the Indian Ocean, and *A. megalostoma* in Oceania, and he further declares that even between these four the boundaries are not clearly defined. The habits of the eel are still not quite understood. So far as is known, it is the only fish, the young of which ascend from the sea to attain an imperfect maturity, and return to the sea to deposit their spawn. The economical value of the eel as a food fish has been now well established, and they easily admit of being artificially introduced into lakes and rivers. The reproduction of the eel has from the days of Aristotle given rise to the most wonderful conjectures and assertions. Leaving out of question such old theories as that the eels are generated from dew, slime, horsehair, and from the skins of old eels, it has been a matter of dispute for centuries whether the eel is an oviparous or a viviparous animal. The reproduction of the eel was a mystery to the learned Greeks. While they knew that other fishes deposited their eggs, no discovery of the eggs of eels was ever made by them. The Greek poets solved the mystery in an off-handed way; for as they were in the habit of assigning to Jupiter the paternity of all children not claimed by earthly fathers, so they attributed the progenitorship of the eels to the same Jove.

With the revival of the study of the natural sciences in the sixteenth century, we find that investigators turned their attention with great ardour to this special subject, and such renowned investigators as Aldrovandi, Rondelet, and Salviani published elaborate treatises on the genera-

tion of the eel; and they were followed by Albertus Magnus, Leuwenhoek, Elsner, Redi, and Fahlberg.

It was in the eighteenth century that for the first time the roe of the female eel was discovered. A surgeon of Comacchio, named Sancassini, in 1707, sent the ovaries, as he thought, of an eel, to the celebrated naturalist Valisneri, who sent an account thereof to the Academy of Bologna. Prof. Valsalva appears to have doubted the correctness of this discovery. The discussion continued. Pietro Molinelli offered a large reward for a gravid eel. In 1777 an eel presenting the same appearance as the one described by Valisneri was sent to Prof. Monti, who, being indisposed for the investigation, gave it over to a set of his favourite pupils, among whom was Camillo Galvani. These students pronounced the anatomical appearance to be the same as described by Valisneri, and the specimen was sent to Prof. Mondini for his opinion, which was published in the Bologna Academy's *Transactions*, to the effect that the ovary described by Valisneri was only the swimming bladder in a diseased condition. But in connection with this opinion Mondini gave and illustrated by magnificent plates a good description, and demonstrations of the true ovaries of the eel as found by himself. This classical work of Mondini has been often overlooked. Later, but quite independently of Mondini, the ovary of the eel was discovered by O. F. Müller. Spallanzani's investigations in 1792 threw doubts upon the discoveries of Mondini and O. F. Müller, so that when Prof. Rathke in 1824 described the ovaries of the eel as two cuff and collar-shaped organs on both sides of the backbone, he was everywhere in Germany (and is to a large extent to the present day) regarded as the discoverer. The first picture of the ovary, after that of Mondini, and the first plate of the microscopical appearance of the egg of the eel was published in a dissertation by Hohnbaum Hornschuch in 1842, and the question of the ovary of the eel may be regarded as definitely settled by the publication by Rathke, in 1853, of a description of a gravid female eel, the first and only specimen of such which had come up to that time into the hands of an investigator.

The search after the roe in the eel was of much later date. In 1842 and up to 1872 the researches of several observers were unrewarded with success.

Of the various mistakes made in this investigation Dr. Jacoby gives us an interesting account. In the meanwhile the late Dr. Syrski, the Director of the Museum of Natural History at Trieste, had undertaken, at the request of the marine officials at Trieste, to determine the spawning-time of the fishes of this region, and he devoted a good deal of his attention to the smaller eels. On November 29, 1873, Dr. Syrski found in an eel, now preserved in the Museum at Trieste, which was fifteen inches long, a completely new organ, which had never before been seen within an eel by any former investigator, although tens of thousands of eels had been zealously studied. Syrski published his discovery in the *Proceedings* of the Vienna Academy for April, 1874, and, according to all the researches up to this time made, there would seem the highest probability that this organ of Syrski is actually the long sought, but immature male organ. The investigation cannot be said to be complete until the presence of spermatozoa is determined; but the recent discovery of such in the similar spermaries of the conger eel, by Dr. Hermes, of Berlin, is a strong confirmation. The eels with the Syrskian organ are smaller than the females, and are to be found only in the sea and brackish water. They have a short and sharply-pointed snout. Their dorsal fin is less broad, and not so high as in the females.

This discovery of Syrski drew attention anew to the solution of the eel problem. Among others, the German Fischerei-Verein in Berlin offered a reward of 50 marks to the person who should first find a gravid eel sufficiently developed to satisfy Prof. Virchow of the fact. Herr